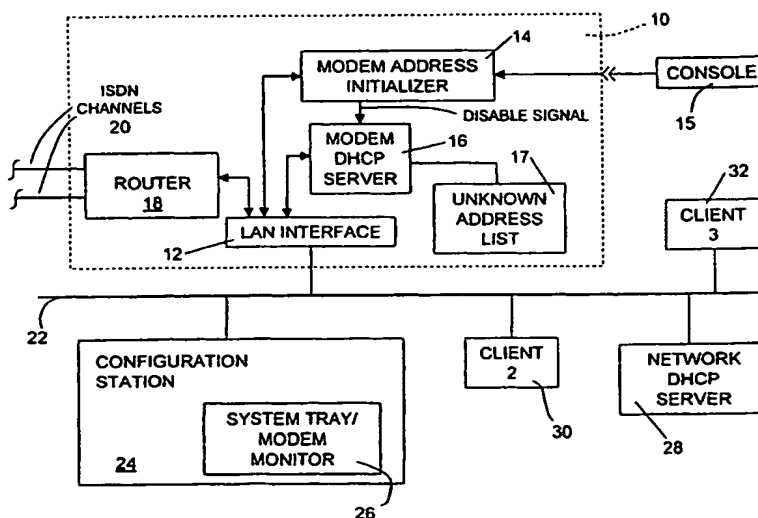




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : H04L 29/12, 12/46		A1	(11) International Publication Number: WO 00/27094
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(21) International Application Number: PCT/CA99/01014 (22) International Filing Date: 29 October 1999 (29.10.99) (30) Priority Data: 2,252,207 30 October 1998 (30.10.98) CA (71) Applicant (for all designated States except US): EICON TECHNOLOGY CORPORATION [CA/CA]; 9800 Cavendish Boulevard, Montreal, Québec H4M 2V9 (CA). (72) Inventor; and (75) Inventor/Applicant (for US only): MOINEAU, Gilbert [CA/CA]; 3255, Dalb�-Viau, Lachine, Qu�bec H8T 3N3 (CA). (74) Agents: ANGLEHART, James et al.; Swabey Ogilvy Renault, Suite 1600, 1981 McGill College Avenue, Montr�al, Qu�bec H3A 2Y3 (CA).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>	

(54) Title: DIGITAL NETWORK MODEM WITH AN INTEGRATED DHCP SERVER



(57) Abstract

The digital network modem has a built-in Dynamic Host Configuration Protocol (DHCP) mechanism for dynamically assigning network addresses to clients on the local network. To prevent confusion with a potentially existing DHCP server on the local network, an autosense mechanism is provided to detect the existence of a DHCP server and disable the internal, built-in DHCP mechanism. At power-on, the modem has no knowledge of clients on the local network, and the addresses in use are checked prior to operation. Addresses in use are placed in a list in a store of unknown addresses, and are not assigned to clients requesting DHCP addresses. When a DHCP client requests an address and has as its current address one of the addresses on the list, the current address is removed from the list. The list of unusable addresses is thus minimized and the same address will not be used for two clients.

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DIGITAL NETWORK MODEM WITH AN INTEGRATED DHCP SERVER

Field of the Invention

The present invention relates to a digital network modem, such as an ISDN or a
5 DSL modem, and more particularly to a digital network modem having a
dynamic host configuration protocol (DHCP) server function integrated into
the modem.

Background of the Invention

10 To facilitate network management in local area networks (LANs), it is known
to provide servers called dynamic host configuration protocol or DHCP
servers. These servers respond to requests from clients connected to the
network to receive assigned dynamic addresses for communication purposes on
the network. The advantage of using such a dynamic address assignment is that
15 new clients can be added easily, and the effort to manage the addresses used on
the network is reduced. In most cases, a DHCP server is provided by software
added to a network server.

When a network which was previously not connected to other networks or
20 when a network needs a faster or additional connection to other networks,
digital network modems are added to provide the desired connection. Network
modems, such as ISDN modems, are assigned an address on the LAN. When
DHCP is used, clients on the LAN are assigned their addresses and can
recognize the modem as a router or gateway by consulting the DHCP, and in
25 this way, each client does not need to have prior knowledge of any fixed
address for the modem.

Computer networks are being installed in more and more residential, office and
industrial environments, and the increase in the number of such networks has
30 increased the need for skilled technicians required to configure and maintain

such networks. While computer networks were very uncommon a few years ago for home users, it is now economically feasible and desirable to interconnect computer devices in a home environment. Any simplification of the task of network management is important from the perspective of both increased reliability and reduced training for the network manager. DHCP therefore offers many practical advantages in managing a network, even for relatively small networks found in homes or small and medium businesses. While some network administrators have taken the time to obtain and install DHCP, many others have not, particularly in home and small business environments.

While it would be advantageous to provide a DHCP server function integrated with a component to be added to a network, such as a digital network modem, for those who would benefit from a DHCP, it is imperative to avoid installing two DHCP servers on the same network, since the result would be confusion and malfunction. Furthermore, having to choose between one modem including DHCP functionality and another modem without DHCP requires the manufacture, distribution and stocking of separate types of modems, and complicates the purchasing choice.

20

Summary of the Invention

It is therefore an object of the invention to provide in a digital network modem (i.e. a router or gateway device) a mechanism for dynamically assigning network addresses on a LAN, such as DHCP, which mechanism has an autosense feature to automatically shut itself off when the modem detects that a similar device is present on the LAN.

25

According to the invention, there is provided a network modem device comprising an integrated mechanism for dynamically assigning network

addresses on a network. The device further comprises a controller circuit connected to the integrated dynamic network address assignment mechanism and detecting the presence of a dynamic address assignment server on the network. The integrated mechanism is disabled when the dynamic address
5 assignment server on the network is detected.

The invention also provides a method of enabling/disabling a mechanism for dynamically assigning network addresses on a network, the mechanism being integrated into a network modem device. The method comprises detecting a
10 presence of a dynamic address assignment server on the network, and disabling the integrated mechanism when the dynamic address assignment server is detected on the network.

It is yet another object of the invention to provide a mechanism for
15 dynamically assigning network addresses on a LAN, such as DHCP, which is able to handle a reinitialization, for example as a result of being turned off and on, without disrupting any clients on the network. According to this feature, the mechanism for dynamically assigning network addresses pings all addresses within its range at power on. The mechanism then reserves any addresses
20 which have responded. New clients requesting dynamic addresses are assigned new addresses within the range, and existing clients request a new address periodically. When an existing client having one of the reserved addresses requests a new dynamic address, the address is removed from the list of unknown and reserved addresses.

25

Brief Description of the Drawings

The invention will be better understood by way of the following detailed description of a preferred embodiment with reference to the appended drawings, in which:

- 5 Fig. 1 is a schematic block diagram of the LAN ISDN modem according to the preferred embodiment connected to a LAN to which a configuration station and a network DHCP server are also connected.

Detailed Description of the Preferred Embodiment

- 10 As illustrated in Fig. 1, the digital modem 10 according to the preferred embodiment is an ISDN modem having a plurality of functional components shown in Fig. 1. The separation of components illustrated in the separate blocks in Fig. 1 is for the purposes of illustration only, and does not necessarily reflect the physical separation of components in the real device which is built
15 from both hardware and software/firmware components.

- When the modem 10 is connected to the Ethernet local area network (LAN) 22 and powered up, a LAN interface 12 and a modem address initializer unit 14 become active. In operation, the modem 10 directs data traffic via router 18
20 onto the selected ISDN channel 20. The initializer unit 14 broadcasts a DHCP discover message on LAN 22 to detect whether a Dynamic Host Configuration Protocol (DHCP) server 28 is present on the LAN 22. While it is essential to check for the existence of a server 28 at start-up, it is also preferred to check for the existence of such a server 28 periodically.

- 25 If a response is received from the server 28, initializer 14 sends a disable signal to the modem's own DHCP server 16. The modem will be assigned a static address, either by direct communication through console 15, or by remote

communication at configuration station 24 using the modem monitor program 26.

If no network DHCP server 28 is present on the LAN 22, then no response is received to the DHCP discover message sent by initializer 14. The DHCP server 16 is then not disabled, and it will be able to operate as a DHCP server on network 22. The modem 10 is assigned a static address, either by direct communication through console 15, or by remote communication at configuration station 24 using the modem monitor program 26. When modem 10 functions as a DHCP server, DHCP server 16 will reply to DHCP discover packets broadcasted by clients 30 and 32 (and possibly station 24) to configure their IP addresses. In the preferred embodiment, when the clients 30,32 are using dynamic addresses and the only DHCP server is 16, all the clients are configured by the modem's DHCP component 16 using addresses in the factory defined range of addresses: 192.168.1.2,....192.168.1.50

In the preferred embodiment, a client station 24 includes a modem monitor 26 which allows the user to manually set the active/inactive state of the DHCP server, in the event that the network manager wants to disable the DHCP server 16, or at a later time re-enable the DHCP server 16. The modem monitor interface is HTML-based and provides a simple interface.

Server 16 also handles a reinitialization, for example as a result of being turned off and on, without disrupting any clients on the network. Server 16 pings all addresses within its range at power on. Any addresses which have responded to the ping are placed on a reserved list 17 of unknown status addresses. These unknown addresses could be DHCP clients or static addresses. New clients requesting dynamic addresses are assigned new addresses within the range of the modem and which are not on the reserved list or list of other addresses

already assigned to DHCP clients since power on. Existing clients request a new address periodically, based on their lease time, which can vary from minutes to months. When an existing client having one of the reserved addresses requests a new dynamic address, the address is removed from the list of unknown and reserved addresses. This frees up the otherwise reserved address. As will be appreciated, a DHCP server would normally copy all address and lease time data to fixed storage and recover from a shut down by retrieving the data from fixed storage. According to the invention, the DHCP mechanism integrated into the modem does not require fixed storage, due to the use of its start-up check for addresses in-use and subsequent free-up of those addresses belonging to DHCP clients upon renewal.

CLAIMS

1. A network modem device comprising an integrated mechanism for dynamically assigning network addresses on a network, the device being characterized in that it further comprises a controller circuit connected to said integrated mechanism and detecting a presence of a dynamic address assignment server on the network, wherein said integrated mechanism is disabled when said server is detected.
2. The device according to claim 1, wherein said device is a digital network modem.
3. The device according to claim 2, wherein said device is an ISDN modem.
4. The device according to one of claims 1 to 3, wherein said integrated mechanism provides a DHCP server function.
5. The device according to claim 4, wherein said controller circuit broadcasts a DHCP discover message on the network and listens to a response to detect said presence of said server.
6. The device according to one of claims 1 to 5, further comprising a start-up mechanism and a memory store of unknown used addresses, said start-up mechanism checking the availability of addresses on the network and placing used addresses in the memory store of unknown used addresses, said integrated mechanism for dynamically assigning network addresses on a network selecting new addresses not included in said store of unknown used addresses, and removing addresses from said store of unknown used addresses when a

client having one of said addresses in said store of unknown used addresses requests a dynamically assigned address.

7. A method of enabling/disabling a mechanism for dynamically assigning network addresses on a network, said mechanism being integrated into a network modem device, the method comprising:

detecting a presence of a dynamic address assignment server on the network, and

disabling said integrated mechanism when said server is detected.

8. The method according to claim 7, wherein said device is a digital network modem.

9. The method according to claim 8, wherein said device is an ISDN modem.

10. The method according to one of claims 7 to 9, wherein said integrated mechanism provides a DHCP server function.

11. The method according to claim 10, wherein said detecting comprises broadcasting from said device onto said network a DHCP discover message and listening to a response to detect said presence of said server.

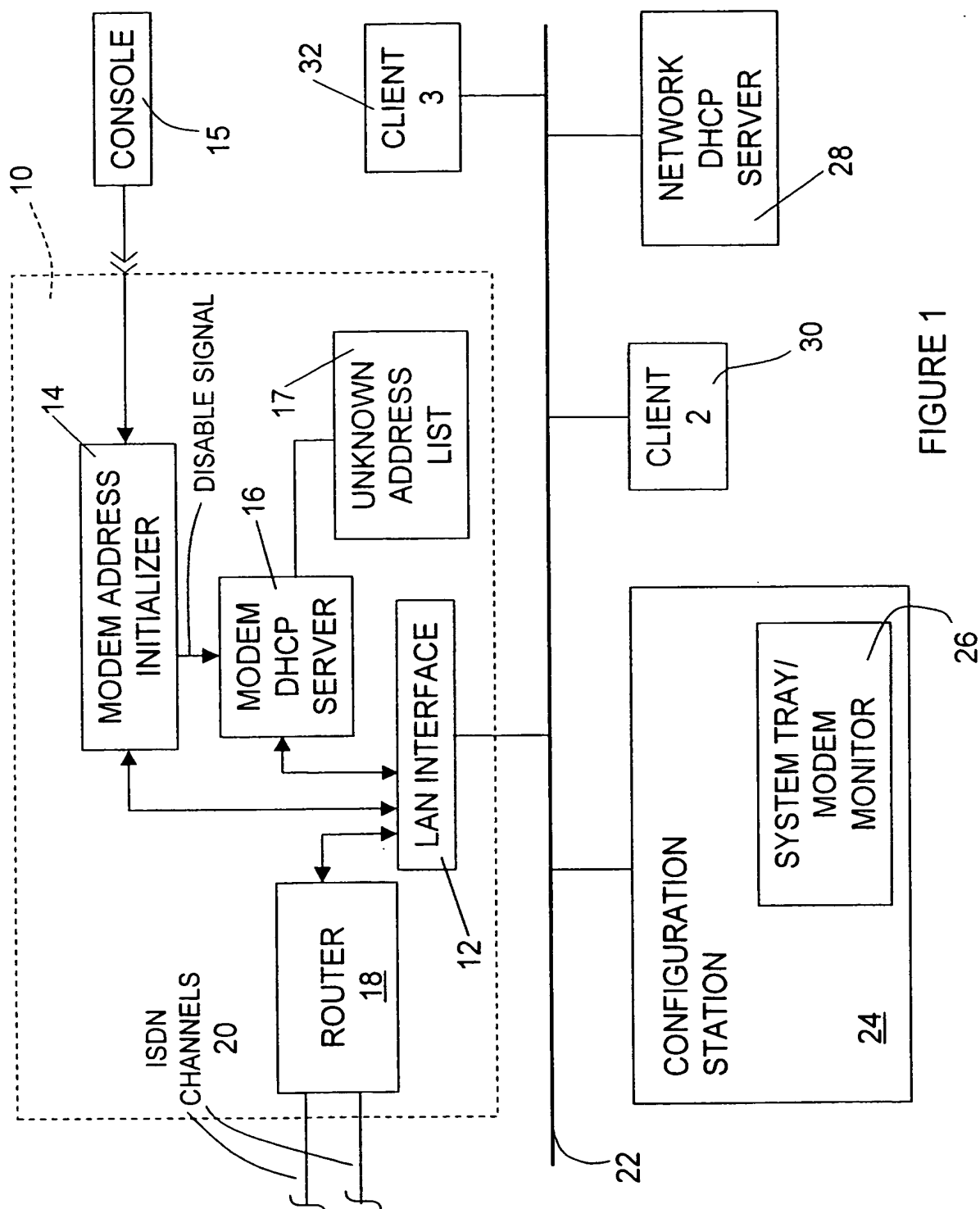
12. The method according to one of claims 7 to 11, further comprising:

checking the availability of addresses on the network after power on and loss of memory of previously dynamically assigned addresses;

storing the used addresses in a store of unknown used addresses;

selecting new addresses not stored in response to a request for a dynamically assigned address; and

removing an address from said store of unknown used addresses when a client having one of said addresses in said store of unknown used addresses requests a dynamically assigned address.



INTERNATIONAL SEARCH REPORT

Inter. Appl. Application No

PCT/CA 99/01014

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04L29/12 H04L12/46

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04L H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	EP 0 843 440 A (CANON INFORMATION SYST INC) 20 May 1998 (1998-05-20) abstract column 1, line 1 -column 3, line 3 column 5, line 18 -column 8, line 40 column 9, line 30 -column 12, line 23 — —/—	1-4,7-10 5,6,11, 12



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Date of the actual completion of the international search

10 March 2000

Date of mailing of the international search report

23/03/2000

Name and mailing address of the ISA

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Lievens, K

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/CA 99/01014

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	<p>WO 98 26548 A (WHISTLE COMMUNICATIONS CORP ; COBBS ARCHIE L (US); LI JIM Y (US); 0) 18 June 1998 (1998-06-18) abstract</p> <p>page 1, line 27 -page 4, line 32 page 6, line 12-15 page 7, line 17 -page 10, line 30 page 11, line 32 -page 12, line 11 page 15, line 17-23 page 17, line 18 -page 20, line 32 figure 6</p>	<p>1-4, 7-10</p> <p>5, 6, 11, 12</p>

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/CA 99/01014

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0843440	A	20-05-1998	US 6021429 A	01-02-2000
			JP 10164095 A	19-06-1998
WO 9826548	A	18-06-1998	US 6012088 A	04-01-2000
			AU 3572697 A	03-07-1998
			EP 0953248 A	03-11-1999

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NOTIFICATION OF ELECTION

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PCT/CA99/01014

Applicant's or agent's file reference

13693-4pctJA

International filing date (day/month/year)

29 October 1999 (29.10.99)

Priority date (day/month/year)

30 October 1998 (30.10.98)

Applicant

MOINEAU, Gilbert

1. The designated Office is hereby notified of its election made:



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29 May 2000 (29.05.00)



in a notice effecting later election filed with the International Bureau on:

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 13693-4pctJA	FOR FURTHER ACTION		see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. PCT/CA 99/ 01014	International filing date (day/month/year) 29/10/1999	(Earliest) Priority Date (day/month/year) 30/10/1998	

Applicant

EICON TECHNOLOGY CORPORATION et al.

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

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☐ filed together with the international application in computer readable form.

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2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

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☐ the text has been established by this Authority to read as follows:

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6. The figure of the drawings to be published with the abstract is Figure No.

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☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1
☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PC 99/01014

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 H04L29/12 H04L12/46

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04L H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	<p>EP 0 843 440 A (CANON INFORMATION SYST INC) 20 May 1998 (1998-05-20) abstract</p> <p>column 1, line 1 -column 3, line 3 column 5, line 18 -column 8, line 40 column 9, line 30 -column 12, line 23</p> <p>— -/--</p>	<p>1-4, 7-10</p> <p>5, 6, 11, 12</p>



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Date of the actual completion of the international search

10 March 2000

Date of mailing of the international search report

23/03/2000

Name and mailing address of the ISA

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Lievens, K

INTERNATIONAL SEARCH REPORT

International Application No

PC 99/01014

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	WO 98 26548 A (WHISTLE COMMUNICATIONS CORP ; COBBS ARCHIE L (US); LI JIM Y (US); 0) 18 June 1998 (1998-06-18) abstract page 1, line 27 -page 4, line 32 page 6, line 12-15 page 7, line 17 -page 10, line 30 page 11, line 32 -page 12, line 11 page 15, line 17-23 page 17, line 18 -page 20, line 32 figure 6	1-4, 7-10 5, 6, 11, 12

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT 99/01014

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 0843440	A	20-05-1998	US	6021429 A	01-02-2000
			JP	10164095 A	19-06-1998
WO 9826548	A	18-06-1998	US	6012088 A	04-01-2000
			AU	3572697 A	03-07-1998
			EP	0953248 A	03-11-1999

such networks. While computer networks were very uncommon a few years ago for home users, it is now economically feasible and desirable to interconnect computer devices in a home environment. Any simplification of the task of network management is important from the perspective of both increased reliability and reduced training for the network manager. DHCP therefore offers many practical advantages in managing a network, even for relatively small networks found in homes or small and medium businesses. While some network administrators have taken the time to obtain and install DHCP, many others have not, particularly in home and small business environments.

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20

Summary of the Invention

It is therefore an object of the invention to provide in a digital network modem (i.e. a router or gateway device) a mechanism for dynamically assigning network addresses on a LAN, such as DHCP, which mechanism has an autosense feature to automatically shut itself off when the modem detects that a similar device is present on the LAN.

25

According to the invention, there is provided a network modem device comprising an integrated mechanism for dynamically assigning network

addresses on a network. The device further comprises a controller circuit connected to the integrated dynamic network address assignment mechanism and detecting the presence of a dynamic address assignment server on the network. The integrated mechanism is disabled when the dynamic address
5 assignment server on the network is detected.

The invention also provides a method of enabling/disabling a mechanism for dynamically assigning network addresses on a network, the mechanism being integrated into a network modem device. The method comprises detecting a
10 presence of a dynamic address assignment server on the network, and disabling the integrated mechanism when the dynamic address assignment server is detected on the network.

It is yet another object of the invention to provide a mechanism for
15 dynamically assigning network addresses on a LAN, such as DHCP, which is able to handle a reinitialization, for example as a result of being turned off and on, without disrupting any clients on the network. According to this feature, the mechanism for dynamically assigning network addresses pings all addresses within its range at power on. The mechanism then reserves any addresses
20 which have responded. New clients requesting dynamic addresses are assigned new addresses within the range, and existing clients request a new address periodically. When an existing client having one of the reserved addresses requests a new dynamic address, the address is removed from the list of unknown and reserved addresses.

25

CLAIMS

1. A network modem device comprising an integrated mechanism for dynamically assigning network addresses on a network, the device being characterized in that it further comprises a controller circuit connected to said integrated mechanism and detecting a presence of a dynamic address assignment server on the network, wherein said integrated mechanism is disabled when said server is detected.
2. The device according to claim 1, wherein said device is a digital network modem.
3. The device according to claim 2, wherein said device is an ISDN modem.
4. The device according to one of claims 1 to 3, wherein said integrated mechanism provides a DHCP server function.
5. The device according to claim 4, wherein said controller circuit broadcasts a DHCP discover message on the network and listens to a response to detect said presence of said server.
6. The device according to one of claims 1 to 5, further comprising a start-up mechanism and a memory store of unknown used addresses, said start-up mechanism checking the availability of addresses on the network and placing used addresses in the memory store of unknown used addresses, said integrated mechanism for dynamically assigning network addresses on a network selecting new addresses not included in said store of unknown used addresses, and removing addresses from said store of unknown used addresses when a

client having one of said addresses in said store of unknown used addresses requests a dynamically assigned address.

7. A method of enabling/disabling a mechanism for dynamically assigning network addresses on a network, said mechanism being integrated into a network modem device, the method comprising:

detecting a presence of a dynamic address assignment server on the network, and

disabling said integrated mechanism when said server is detected.

8. The method according to claim 7, wherein said device is a digital network modem.

9. The method according to claim 8, wherein said device is an ISDN modem.

10. The method according to one of claims 7 to 9, wherein said integrated mechanism provides a DHCP server function.

11. The method according to claim 10, wherein said detecting comprises broadcasting from said device onto said network a DHCP discover message and listening to a response to detect said presence of said server.

12. The method according to one of claims 7 to 11, further comprising:
checking the availability of addresses on the network after power on and loss of memory of previously dynamically assigned addresses;
storing the used addresses in a store of unknown used addresses;
selecting new addresses not stored in response to a request for a dynamically assigned address; and

removing an address from said store of unknown used addresses when a client having one of said addresses in said store of unknown used addresses requests a dynamically assigned address.

PATENT COOPERATION TREATY

Fax 514-288-8389

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To: SWABEY OGILVY RENAULT 1981 McGill College Avenue Suite 1600 Montréal, Québec H3A 2Y3 CANADA		SWABEY OGILVY RENAULT MCGILL COLLEGE REC'D FEB 8 2001 AM. 7 9 9 10 11 12 1 2 3 4 5 6	PCT - 10 pages Confirmation FAX-Bestätigung NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Rule 71.1) <i>sent in advance</i>
Date of mailing (day/month/year) 25. 01. 01		IMPORTANT NOTIFICATION	
Applicant's or agent's file reference 13693-4pct JA		International application No. PCT/CA99/01014	
International filing date (day/month/year) 29/10/1999		Priority date (day/month/year) 30/10/1998	
Applicant EICON TECHNOLOGY CORPORATION et al.			



1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.


Name and mailing address of the IPEA/  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Ahrens, R Tel. +49 89 2399-8136	
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 13693-4pct		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/CA99/01014	International filing date (day/month/year) 29/10/1999	Priority date (day/month/year) 30/10/1998	
International Patent Classification (IPC) or national classification and IPC H04L29/12			
Applicant EICON TECHNOLOGY CORPORATION et al.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 4 sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input checked="" type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application 			
Date of submission of the demand 29/05/2000		Date of completion of this report 25. 11. 01	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Ferrari, J Telephone No. +49 89 2399 8803	



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/CA99/01014

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

Description, pages:

1,4-6	as originally filed			
2,3	as received on	05/01/2001	with letter of	04/01/2001

Claims, No.:

1-10	as received on	05/01/2001	with letter of	04/01/2001
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Drawings, sheets:

1/1	as originally filed
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2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Ru. 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/CA99/01014

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-10
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-10
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-10
	No:	Claims	

- 2. Citations and explanations**
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

Ad section V.:

CLAIMS 1, 6

The present application relates to a network modem device and to a method for dynamically assigning network addresses on a LAN.

Prior art document EP-A-0 843 440 discloses a method which controls a network device on a local area network to operate as a list manager which maintains a list of device addresses (dynamic addresses) for the LAN. The method determines whether a list manager is operating on the LAN, and in case of detecting such a list manager, controlling the network device to operate only as a slave on the LAN, and when no list manager is detected on the LAN, controlling the network device to operate as the list manager for the LAN.

In order to prevent confusion with an existing dynamic host configuration protocol (DHCP) server on the LAN, the solution proposed by the present application and in particular by the apparatus and method according to claims 1 and 6 respectively, provides an autosense mechanism to detect the existence of a DHCP server on the LAN and to disable the internal, built-in DHCP mechanism when said server is detected. At power-on, the network modem device checks the availability of addresses in use on the network prior to operation. Addresses in use are placed in a list in a store of unknown addresses, and are not assigned to clients requesting DHCP addresses. When a DHCP client requests an address and has as its current address one of the addresses on said list, the current address is removed from the list.

This specific concept as defined by the combination of features of claim 1 or 6 respectively, is not to be taken or obviously derived from one of the documents cited in the International Search Report in the sense of Rule 33(1) PCT.

The requirements of Article 33 PCT are therefore fulfilled for these independent claims.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/CA99/01014

CLAIMS 2-5, 7-10

Dependent claims 2 to 5 and 7 to 10 contain further details of the network modem device of claim 1 and the enabling/disabling method of claim 6 respectively. As they are dependent on these claims, they also satisfy the requirements of Article 33 PCT.

Ad section VII.:

The following deficiencies are found in the application:

- a) The claims do not meet the requirements of Rule 6.2b PCT in that they do not contain reference signs.
- b) Independent claims 1 and 6 do not meet the requirements of Rule 6.3b PCT in that they are not divided in the correct two-part form.

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such networks. While computer networks were very uncommon a few years ago for home users, it is now economically feasible and desirable to interconnect computer devices in a home environment. Any simplification of the task of network management is important from the perspective of both increased reliability and reduced training for the network manager. DHCP therefore offers many practical advantages in managing a network, even for relatively small networks found in homes or small and medium businesses. While some network administrators have taken the time to obtain and install DHCP, many others have not, particularly in home and small business environments.

While it would be advantageous to provide a DHCP server function integrated with a component to be added to a network, such as a digital network modem, for those who would benefit from a DHCP, it is imperative to avoid installing two DHCP servers on the same network, since the result would be confusion and malfunction. Furthermore, having to choose between one modem including DHCP functionality and another modem without DHCP requires the manufacture, distribution and stocking of separate types of modems, and complicates the purchasing choice.

European Patent Application No. 0 843 440 to Danknick, Dan and entitled "Network Device Which Maintains A List Of Device Addresses" describes a method which controls a network device on a local area network to operate as a list manager which maintains a list of device addresses for the LAN. It detects if a list manager is operating on the LAN and if so, controls the device to operate as a slave. If not, the device becomes the list manager on the LAN for the various devices on the LAN.

Summary of the Invention

It is therefore an object of the invention to provide in a digital network modem (i.e. a router or gateway device) a mechanism for dynamically assigning network addresses on a LAN, such as DHCP, which mechanism has an auto-sense feature to automatically shut itself off when the modem detects that a similar device is present on the LAN.

According to the invention, there is provided a network modem device comprising an integrated mechanism for dynamically assigning network addresses on a network, the network modem device being characterized in that it

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comprises: a controller circuit detecting a presence of a dynamic address assignment server on the network; an interrupter disabling the integrated mechanism when the controller circuit detects the server; and a memory store of unknown used addresses; wherein the integrated mechanism comprises: a start-up mechanism checking the availability of addresses on the network and placing used addresses in the memory store of unknown used addresses; an address manager selecting new addresses not included in the store of unknown used addresses, and removing addresses from the store of unknown used addresses when a client having one of the addresses in the store of unknown used addresses requests a dynamically assigned address.

The invention also provides a method of enabling/disabling a mechanism for dynamically assigning network addresses on a network, the mechanism being integrated into a network modem device, the method comprising: detecting a presence of a dynamic address assignment server on the network; and disabling the integrated mechanism when the server is detected; checking the availability of addresses on the network after power on and loss of memory of previously dynamically assigned addresses; storing the used addresses in a store of unknown used addresses; selecting new addresses not stored in response to a request for a dynamically assigned address; and removing an address from the store of unknown used addresses when a client having one of the addresses in the store of unknown used addresses requests a dynamically assigned address.

It is yet another object of the invention to provide a mechanism for dynamically assigning network addresses on a LAN, such as DHCP, which is able to handle a re-initialization, for example as a result of being turned off and on, without disrupting any clients on the network. According to this feature, the mechanism for dynamically assigning network addresses pings all addresses within its range at power on. The mechanism then reserves any addresses which have responded. New clients requesting dynamic addresses are assigned new addresses within the range, and existing clients request a new address periodically. When an existing client having one of the reserved addresses requests a new dynamic address, the address is removed from the list of unknown and reserved addresses.

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CLAIMS

1. A network modem device comprising an integrated mechanism for dynamically assigning network addresses on a network, the network modem
5 device being characterized in that it comprises:
 - a controller circuit detecting a presence of a dynamic address assignment server on the network;
 - an interrupter disabling said integrated mechanism when said controller circuit detects said server; and
 - 10 a memory store of unknown used addresses;
 - wherein said integrated mechanism comprises
 - a start-up mechanism checking the availability of addresses on the network and placing used addresses in said memory store of unknown used addresses;
 - 15 an address manager selecting new addresses not included in said store of unknown used addresses, and removing addresses from said store of unknown used addresses when a client having one of said addresses in said store of unknown used addresses requests a dynamically assigned address.
- 20 2. The device according to claim 1, wherein said network modem device is a digital network modem.
3. The device according to claim 2, wherein said network modem device is an ISDN modem.
- 25 4. The device according to one of claims 1 to 3, wherein said integrated mechanism provides a DHCP server function.

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5. The device according to claim 4, wherein said controller circuit broadcasts a DHCP discover message on the network and listens to a response to detect said presence of said server.
- 5 6. A method of enabling/disabling a mechanism for dynamically assigning network addresses on a network, said mechanism being integrated into a network modem device, the method comprising:
- detecting a presence of a dynamic address assignment server on the network; and
- 10 disabling said integrated mechanism when said server is detected;
- checking the availability of addresses on the network after power on and loss of memory of previously dynamically assigned addresses;
- storing the used addresses in a store of unknown used addresses;
- selecting new addresses not stored in response to a request for a
- 15 dynamically assigned address; and
- removing an address from said store of unknown used addresses when a client having one of said addresses in said store of unknown used addresses requests a dynamically assigned address.
- 20 7. The method according to claim 6, wherein said device is a digital network modem.
8. The method according to claim 7, wherein said device is an ISDN modem.
- 25 9. The method according to one of claims 6 to 8, wherein said integrated mechanism provides a DHCP server function.
10. The method according to claim 9, wherein said detecting comprises broadcasting from said device onto said network a DHCP discover message and
- 30 listening to a response to detect said presence of said server.